Claims

1. A Cartesian loop transmitter (100) comprising a forward path (102) and a feedback path (104), each of these paths comprising an I-channel and a Q-channel, as well as an isolator eliminator (106) **characterized in that** said transmitter (100) comprising:
   a) a first low pass filter (138) and a first wide band pass filter (142) connected to said I-channel at LP2;
   b) a second low pass filter (140) and a second wide band pass filter (144) connected to said Q-channel at LP2;
   c) a first root mean square detector (150) collecting signal from said first wide band pass filter (142) and from said second wide band pass filter (144);
   d) a second root mean square detector (152) collecting signal from said first low pass filter (138) and from said second low pass filter (140);
   e) a first divider (156) connected to said first and said second root mean square detectors (150 and 152);
   f) a means for comparing (160) connected to said first divider (156) and to
   g) a microprocessor (162) connected to input attenuators (108 and 110) on said I- and Q-channels.

2. The Cartesian loop transmitter according to claim 1 further comprising:
   a) a first narrow band pass filter (146) connected to said I-channel at LP2;

b) a second narrow band pass filter (148) connected to said Q-channel at LP2;

c) a third root mean square detector (154) collecting signal from said first narrow band pass filter (146) and from said second narrow band pass filter (148);

d) a second divider (158) connected to said second and said third root mean square detectors (152 and 154) and to said means for comparing (160).

3. The Cartesian loop transmitter according to claim 1 or 2 wherein a memory (164) is connected to said microprocessor (162).

4. The Cartesian loop transmitter according to any one of preceding claims wherein a generator (166) is connected to said microprocessor (162).

5. The Cartesian loop transmitter according to claim 4 wherein said generator is a sine wave generator.

6. A method of adjusting an output level of a Cartesian loop transmitter (100) in a digital radio system, the method comprising the steps of:

a) generating a small signal (200) at a predefined frequency offset;

b) applying a factory predefined attenuation setting (202) for adjusting said output level if attenuation setting for a previous slot is not available (201), or

c) applying said attenuation setting obtained in previous (204) slot for adjusting said output level in a current slot;

d) measuring an on-channel baseband signal level (212) at LP2;

e) measuring said small signal level (214) at a predefined frequency offset at LP2;

f) calculating a first ratio (218) of said small signal level to said on-channel baseband signal level; and

g) increasing an attenuation setting (224) of an input signal if said first ratio is above a first threshold (220);

h) storing (232) said attenuation setting in a memory.

7. The method according to claim 6 wherein said small signal level is measured after filtering in a wide band pass filter (205.2).

8. The method according to claim 6 or 7 wherein said on-channel signal level is measured after filtering in a low pass filter (205.1).

9. The method according to any one of claims 6 to 8 further comprising steps:

e1) measuring said small signal level (216) after filtering in a narrow band pass filter (205.3) at said predefined frequency offset at LP2;

f1) calculating a second ratio (218) of said small signal level after filtering in said narrow band pass filter to said on-channel baseband signal level; and

g1) reducing said attenuation setting (228) of an input signal if said second ratio is below a second threshold (222).

10. The method according to any one of claims 6 to 9 wherein steps d) through h) are repeated in a loop until said first ratio and said second ratio are

between said first and said second thresholds and until there is a modulated signal to transmit.

11. The method according to any one of claims 6 to 10 wherein for determining said first or said second ratio root mean square values of said on-channel baseband signal level (212) and a root mean square of said small signal level (214 and 216) are taken.

12. The method according to any one of claims 6 to 11 wherein after increasing said attenuation setting a first delay is applied (226) to execution of software, which based on next samples, calculates said first and said second ratio and increases said attenuation setting.

13. The method according to any one of claims 6 to 11 wherein after reducing said attenuation setting a second delay is applied (230) to execution of software, which based on next samples, calculates said first and said second ratio and increases said attenuation setting.

14. The method according to any one of claims 6 to 13 wherein said small signal is generated on a level significantly below said on-channel signal level.

15. A radio transmitter according to any one of claims 1 to 5 and which is operable to provide communications in at least TETRA and/or GSM and/or IDEN communication systems.

16. A radio communication device incorporating a circuit according to any one of claims 1 to 5.

17. A radio communication device operating in accordance with a method according to any one of claims 6 to 14.